

Claims:

1. In a WDM optical communication system that includes a plurality of nodes interconnected by communication links, a node, comprising:

an optical coupling arrangement having at least one input port for receiving a WDM signal and a plurality of output ports for selectively receiving one or more wavelength components of the WDM optical signal, said arrangement being adaptable to reconfigure its operational state to (i) selectively direct any one of the wavelength components received on the input port to any of the output ports independently of any other of the wavelength components and (ii) selectively direct any combination of two or more of the wavelength components from the input port to at least two of the output ports that serve as WDM output ports;

at least one optical WDM interface optically coupled to a first of the WDM output ports, said optical WDM interface being adapted to receive, at different times, a transponder and a transmission link through which a WDM signal can be communicated; and

at least one transponder coupled to a second of the WDM output ports.

2. In the system of claim 1, a node wherein said transponder is adapted to receive multiple wavelength components from the second WDM output port.

3. An interconnection device for communicating in an all-optical manner a WDM signal between at least first and second WDM optical communication systems that each include a plurality of nodes interconnected by communication links, said interconnection device comprising:

a plurality of optical coupling arrangements each operatively associated with a different one of the communications systems for directing in an optically transparent manner wavelength components between the nodes in their respective communication systems, each of said optical coupling arrangements including: at least one first port for receiving a WDM optical signal from one of the communication systems and a plurality of second ports for selectively receiving any two or more wavelength

components of the optical signal, at least one of said optical coupling arrangements being adaptable to route in an optically transparent manner every wavelength component between the at least one first input port and the plurality of second ports independently of every other wavelength component; and

an optical waveguide supporting at least two wavelength components and coupling a second output of the first optical coupling arrangement to a second output of the second coupling arrangement.

4. A method of routing three or more wavelength components of a WDM optical signal within a first communication system and between a first communication system and a second communication system, said first communication system including a first node having a first optical path therethrough for transporting wavelengths components to other nodes in the first communication system and a second optical path therethrough for transporting wavelength components to the second communication system, said method comprising the steps of:

routing in an optically transparent manner any combination of one or more wavelength components through the first optical path of the first node; and

routing in an optically transparent manner over a single optical waveguide any combination of two or more remaining wavelengths components over the second optical path between the first node of the first communication system and a node of the second communication system.